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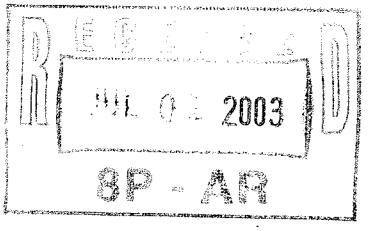

Richard Long, Director
Air and Radiation Program (8P-AR)
U.S. EPA - Region VIII
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Re: Dispersion Modeling Analysis

Dear Mr. Long:

The North Dakota Department of Health (hereafter Department) has reviewed the draft report titled "Dispersion Modeling Analysis of PSD Class I Increment Consumption in North Dakota and Eastern Montana" (May 2003 version). The Department has the following comments:

1. EPA has used three different methodologies for calculating emissions for the various source categories. Even within a source category, EPA is inconsistent in its methodology. For the various source categories, the methodologies appear to be as follows:

   A. Existing Sources - 90th Percentile and Annual Average
   B. Increment Expanding Sources - Annual Average
   C. Oil & Gas Wells - Average per operating hour based on days of production.

   In addition, EPA has not made a determination of "normal operations" for any source category. These inconsistencies cause an underestimate of baseline and increment expanding emission rates and an overestimate of increment consuming emission rates.

2. On page 19, the minor source baseline date for Region 172 in North Dakota is December 19, 1977, not December 17, 1977.

3. There is no reliable evidence to indicate that the peak-to-mean emission rate ratio for a source during the current period is the same as during the baseline period. Changes in coal quality and production rates will affect this ratio. EPA has not demonstrated that this assumption is valid.

4. EPA recognizes that 1978 was a turnaround year for the Mandan Refinery. The Department believes that 1978 did not represent normal operations for the refinery. EPA seems to agree and states "while that may be the case for a 1976-1977 baseline period (i.e., for the North Dakota Class I areas), EPA will consider it to be representative of normal operation for a 1977-78 baseline period (i.e., for the Montana Class I area)". Normal operations cannot be defined by which baseline period is being modeled. If 1978 is determined to be a year when normal operations did not occur for a 1976-77 baseline period, then it is not normal operations for any other baseline period in another state.

5. Oil and gas emissions estimates provided by the Department are not peak short-term emission rates. The emission rates are based on monthly production data, not hourly or daily data, so one can not derive short-term emission rates (1-hour to 24-hour) from these data. The issue is whether the total emissions should be divided by the total number of hours in a period or by the hours of operation. The State's position is that dividing by hours of operation is appropriate. For oil and gas production data, the production volumes are divided by days of production.

   To conduct an analysis consistent with rates representative for other sources, EPA must devise a valid method for determining peak 24-hour emission rates for oil and gas wells.

6. There are no reliable ambient monitoring data and very little reliable gas production data from 1976-77, so it is difficult to draw conclusions about oil and gas emissions from the baseline period from earlier or later years' monitoring or production data. Also, one can not judge emission levels strictly from oil or gas production volumes, because some of the gas production may be sold to a gas processing plant and not released to the atmosphere (flared or burned in treater). In 1976-77 there was considerable new oil and gas development in west-central North Dakota and no gas processing plants in the area. By 1981 there were gas processing plants operating in west-central North Dakota and thus much of the gas production was sold to the gas plants and not released to the atmosphere. Therefore, greater production in later years does not necessarily imply greater emissions.

7. EPA stated the only major adjustment to the baseline estimates based on Williston Basin Study data was to apply the calculations to wells actually in operation in 1977. There was an additional adjustment used. Gas production in 1988 that was sold to gas plants in west-central North Dakota could not have been sold in 1977 because there were no gas plants in the area.

This 1988 sold gas volume would have been flared without a gas plant nearby, so the 1988 sold gas was added to the 1988 flared gas to produce the estimated 1977 flared gas volume. This situation would apply to the Billings County data referred to by EPA.

8. It may be inappropriate to interpret production trends for any individual oil and gas field based on county-wide or state-wide totals, because wells or fields in one region of the state could be produced very differently from wells or fields in another region, and H2S levels vary by well and by location.

9. The use of annual average emission rates for increment expanding sources is inconsistent with the use of 90th percentile emissions for other existing sources. In addition, a determination of "normal operations" for these sources must be made in order to appropriately assess the baseline emission rates. We agree with EPA's conclusion that the use of different methodologies to calculate base year and current year emissions would produce inappropriate results, as is in this case.

10. The Royal Oak briquetting plant had completed construction of one of the new Herreschoff carbonizer furnaces by the baseline date (Dec. 19, 1977) and was well along on construction of the second unit. The Department believes the first Herreschoff carbonizer furnace had not achieved "normal operations" in the 17 months prior to the baseline date. Again, EPA is determining baseline emission rates without first determining whether the selected baseline period is representative of "normal operations" for the source. We also believe the language in the preamble to the 1980 PSD rules is applicable to this source which states "EPA thus believes that sufficient flexibility exists within the determination of actual emissions to allow any reasonably anticipated increases or decreases genuinely reflecting normal operations to be included in the baseline concentration" (FR Vol. 45, No. 154, P. 52714). The Department has selected 1978-1979 as a period representative of "normal operations". The production rate during this period could have easily been achieved with the three carbonizer furnaces that were in existence on the baseline date. The 1976-77 period does not represent "normal operations" for this source.

11. In the comments about normal operations for the Leland Olds Station, EPA cites a May 3, 1976 letter from Basin Electric to the Department indicating that Unit 2 had recently operated consistently at or near the nameplate load of 440 megawatts and thus EPA calculated emissions based on 1976-77 activities data. EPA apparently ignored the May 26, 1976 letter from Basin Electric to the Department which indicated further problems had developed with the unit. The May 3, 1976 letter states that

"the plant had only recently (emphasis added) operated at nameplate capacity". We do not consider one or two months of operation at nameplate capacity to represent "normal operations" for a two-year period, especially when annual emissions are used to calculate peak emission rates. We believe EPA needs to investigate further in order to determine a baseline period which represents "normal operations" for this unit. We recommend the 1977-78 period for the baseline emission rate calculation.

12. The Department believes EPA's current interpretation of the variance provisions of PSD is inconsistent with the will of Congress, the Clean Air Act, and the PSD rules. We believe, as previous EPA and FLM managers believed, that emissions from all sources included in the AQRV's analysis were covered by the variance procedures which allowed for use of alternate increments. Pursuant to 42 USC, Section 7475, sources permitted under the variance procedures should only count against the alternate increments, not the increments in 42 USC, Section 7473, when the FLM certifies no adverse impact from the sources.

13. The Department believes the definition of "actual emissions" requires the use of average emissions per operating hour. EPA's approach does not consider the hours of operation for each source and is not consistent with the PSD rules.

14. The requirements of 40 CFR 75 for continuous emission monitors (CEM's) may lead to an overestimation of emissions. This is evident from the requirements of 40 CFR 75, Appendix A, Section 7.6.5. This section requires the use of the highest bias adjustment factor (BAF) for flow when a BAF is determined at different loads. It also does not allow the BAF's to be less than 1.0. This means that a CEM system that is reading higher than the reference method cannot be adjusted downward, leading to an overestimation of emissions. In addition, the data substitution requirements of 40 CFR 75 are conservative and tend to overestimate emissions.

15. We agree there are problems with the average AP-42 emission factor of 30(S). These problems, in consort with the possible CEM bias, leads to an overestimate of increment consuming emission rates or an underestimate of increment expanding emission rates.

AP-42 factors should only be used when no other valid data is available for calculating emissions. The "Introduction" to AP-42 makes the following statements:

- "Use of these factors as source-specific limits and/or as emission regulation compliance determinations is not recommended by EPA".

- "Data from source-specific emissions tests or continuous emissions monitors are usually preferred for estimating a source's emissions because those data provide the best representation of the tested source's emissions".

- "Average emissions differ significantly from source-to-source and, therefore, emission factors frequently may not provide adequate estimates of the average emissions for a specific source. The extent of between-source variability that exists, even among similar individual sources, can be large depending on process, control system, and pollutant."

- "Estimates of short-term emissions for specific sources are often needed for regulatory purposes. Using emission factors to estimate short-term emissions will add further uncertainty to the emissions estimates. Short-term emissions from a single specific source often vary significantly with time because of fluctuations in process operating conditions, control device operating conditions, raw materials, ambient conditions, and other factors."

- "To assess with-in source variability and the range of short-term emissions from a source, one needs either a number of tests performed over an extended period of time or continuous monitoring data from an individual source."

AP-42 makes it clear that its factors may not be accurate for individual sources. CEM data is available to calculate site specific emission factors for the existing baseline power plants. As pointed out in the "Introduction", CEM data is preferable to AP-42 emission factor calculations. The Department has calculated site specific emission factors for each existing baseline source based on CEM data and recommends that EPA use these site specific factors to obtain valid emissions estimates for the baseline period. That analysis, which is part of the Department's baseline emission rate analysis, indicates that a higher emission factor than 30(S) is warranted for Leland Olds Station Units 1 and 2, Minnkota Unit 1, and Stanton Station Unit 1. A lower emission factor is warranted for Heskett Station Units 1 and 2. This conclusion is supported by the document "Some Studies on Stack Emissions for

Lignite Fired Power Plant" which is the primary basis for the AP-42 emission factor 30(S) for lignite combustion.

The comparison of CEM data to emissions calculated from the "average" AP-42 emission factor 30(S) is also inconsistent. We believe that emission factors calculated from 2000-2001 CEM and the sources' 2000-2001 Annual Emission Inventory Reports provides a consistent basis for comparison of baseline emission rates to current CEM data. Using these factors would also eliminate any bias in the CEM data. Again, we agree with EPA that the use of inconsistent methodologies for determining emissions from the base year and current year will produce inappropriate conclusions.

16. EPA has used annual average emission rates for the Colstrip Power Plant. This is inconsistent with the approach taken for North Dakota increment consuming sources. We believe all sources, including baseline sources, increment expanding sources, and increment consuming sources must be modeled using emissions calculated on consistent basis, i.e. average per operating hour. The use of annual average emissions is not supported by the definition of "actual emissions" because it does not account for the actual hours of operation.

17. On p. 29, Table 3-2, emissions from the Lignite Gas Plant were from an incinerator stack, not a flare. The Lignite Gas Plant and Grasslands Gas Plant have been injecting their acid gas into deep injection wells. They have virtually no SO_2 emissions. The Title V permits for these sources have been, or are in the final process of being modified to include the requirement for acid gas injection. These two sources should be removed from the current year inventory.

18. On p.29, Table 3-2, the inclusion of emissions from the flares at the gas plants, the bypass stack at DGC and some of the emissions from the flares at DGC and the Mandan Refinery should not be included in the current year inventory. These emissions are temporary and are due to operations that are not "normal operations" for the facilities.

19. EPA states that where CEM data were not available to calculate a peak-to-mean ratio, short-term emissions were calculated by dividing the annual average emissions over 365 days. This methodology substantially underestimates peak 24-hour emission rates for increment expanding and baseline sources where the method was used. Again, this methodology is inconsistent with the definition of "actual emissions" which requires the use of a unit's actual operating hours.

20. EPA uses the annual emissions that were provided for the Mandan Refinery by BP (now owned by Tesoro) yet ignores, without explanation, the 24-hr emission estimates that were provided with the annual emission estimates. We recommend EPA use the 24-hr emission estimates provided by BP.

21. The years of MM4 data and MM5 data that were used to drive Calpuff should be identified.

22. The Department has updated its baseline sulfur dioxide inventory for oil and gas wells. We recommend that EPA use this updated inventory, with proper adjustments to make it consistent with other emissions estimates, in EPA's final analysis.

23. The report should explain that in addition to limiting minor source consideration to 50 kilometers, or less, from the Class I areas, minor sources with emissions estimates of less than 0.001 g/sec were also excluded.

24. The location patterns of model receptors in the Class I areas were not provided. Inclusion of a map of receptor locations would be helpful.

25. When discussing the State's model performance evaluation, EPA should note that this evaluation was conducted with actual emissions from all major sources in the region. EPA's increment consumption analysis was conducted using only changes in emission rates. This difference in emission rates brings into question the validity of using the Department evaluation to substantiate EPA's modeling approach.

26. The report should explain how the emission rates for the various oil and gas wells were derived. Was this done on an individual well basis, field basis?

27. The Little Knife Gas Plant and Dakota Gasification Company were permitted by the Department under the variance procedures of the PSD rules. The Federal Land Managers (FLM's) certified there was no adverse impact on air quality related values in the Class I areas from these sources and others. A "variance" was not issued; upon notice by the FLM of Certification of No Adverse Impact, the Department granted a Permit to Construct. This is consistent with the CAA and PSD rules which provide for alternative increments.

28. In Tables 4-1 to 5-1, it should be explained how the number of exceedances were tabulated. An explanation of Calpuff post processing procedures used to determine net increment consumption (especially for increment expanding sources/negative emissions) should be included.

29. On p.9, a footnote appears to be missing (Reference 10).

30. The Department believes the values for Calmet input parameters R1 and R2 should be larger, especially for years with MM data, in order to achieve a better balance between MM fields and observations (the Department used R1=40 and R2=60).

31. EPA should include a description of the treatment of baseline sources which have shut down (i.e., Neal Station, Beulah Station, Flying J Refinery).

32. The baseline concentration is a single value for the year(s) for each Class I area used as the benchmark for subsequent deterioration of ambient sulfur dioxide. EPA did not calculate the baseline concentration.

33. The discussion of model testing in Section 2.1.3 does not provide a subjective or objective description of a criterion that was used to measure whether comparison of original model results to MM5 driven model results are different so as to consider that MM5 did not significantly change results.

34. Since the Fort Peck Indian Reservation was reclassified to Class I after many of the major sources in North Dakota were permitted, we believe the Class I increments for the reservation cannot be retroactively applied to these sources.

In summary, we believe EPA's methodology for determining increment consumption is inconsistent and not in accordance with rule and law and the rationale for its methodology often appears arbitrary.

Respectfully,

Terry L. O'Clair, P.E.
Director
Division of Air Quality

TLO/TB:csc
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